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Fresh Food Delivery System Based on Suburban Community

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Fresh Food Delivery System Based on Suburban Community

By

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Thesis

Master of Fine Art in Industrial Design

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Apr, 2017

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Abstract

Healthy eating is one of the biggest problem that affect people's health in US, unhealthy eating causes billions of dollars on related disease every year. Eating more fresh food is one the most efficient and simplest way to improve this situation, So questions are why certain people can not eat enough fresh food and how to help them eat more fresh food. Following the questions, my research shows that there are multiple reasons involved including long commute time, far away from fresh food shop and price, according to the research, a fresh food delivery system based on suburban community called FRESHBOY came up to solve this problem. The outcomes including the whole system design, the delivery tool and package design and the order application design. This project helps users access to fresh food more easily by saving time for them, it also helps reduce the waste which helps users consume fresh food more efficient, besides, it offers work opportunities for teenagers and it potentially creates social connections between neighborhoods. Overall FRESHBOY helps people access to fresh food more easily, at the same time, a lot of benefit came up with it.

Introduction

Problem Definition

Unhealthy eating may cause Obesity, Type 2 Diabetes, Heart Disease and Nutritional Deficiencies. These diseases not only bring a lot of problems in peoples' daily life, but also create a huge burden on the whole society, take Obesity for instance:

- Obese people account for a disproportionate share of health-related absences from work.
- Obesity accounts for 7 percent of lost productivity due to sick leave and disability.
- Obese people visit their physicians 40 percent more than normal weight people.
- Obese people are 2.5 times more likely to require drugs prescribed for cardiovascular and circulation disorders.
- Liposuction is the Number 1 form of cosmetic surgery in the US, with 400,000 operations a year.
- Over 100,000 people a year have gastric bypass surgery.

Besides, Estimated healthcare costs related to obesity are \$147 billion per year that's nearly 12% of total healthcare expenditures, and it is growing every year^[1].

Challenge and Opportunity

According to the situation, helping people eat healthier is critical, there is several ways to eat healthier, the most straightforward and easiest way is to eat more fresh food, so the problem is how to help people eat more fresh food, therefore, find out why people not eat enough fresh food and how to solve it through design method are my goal in this project.

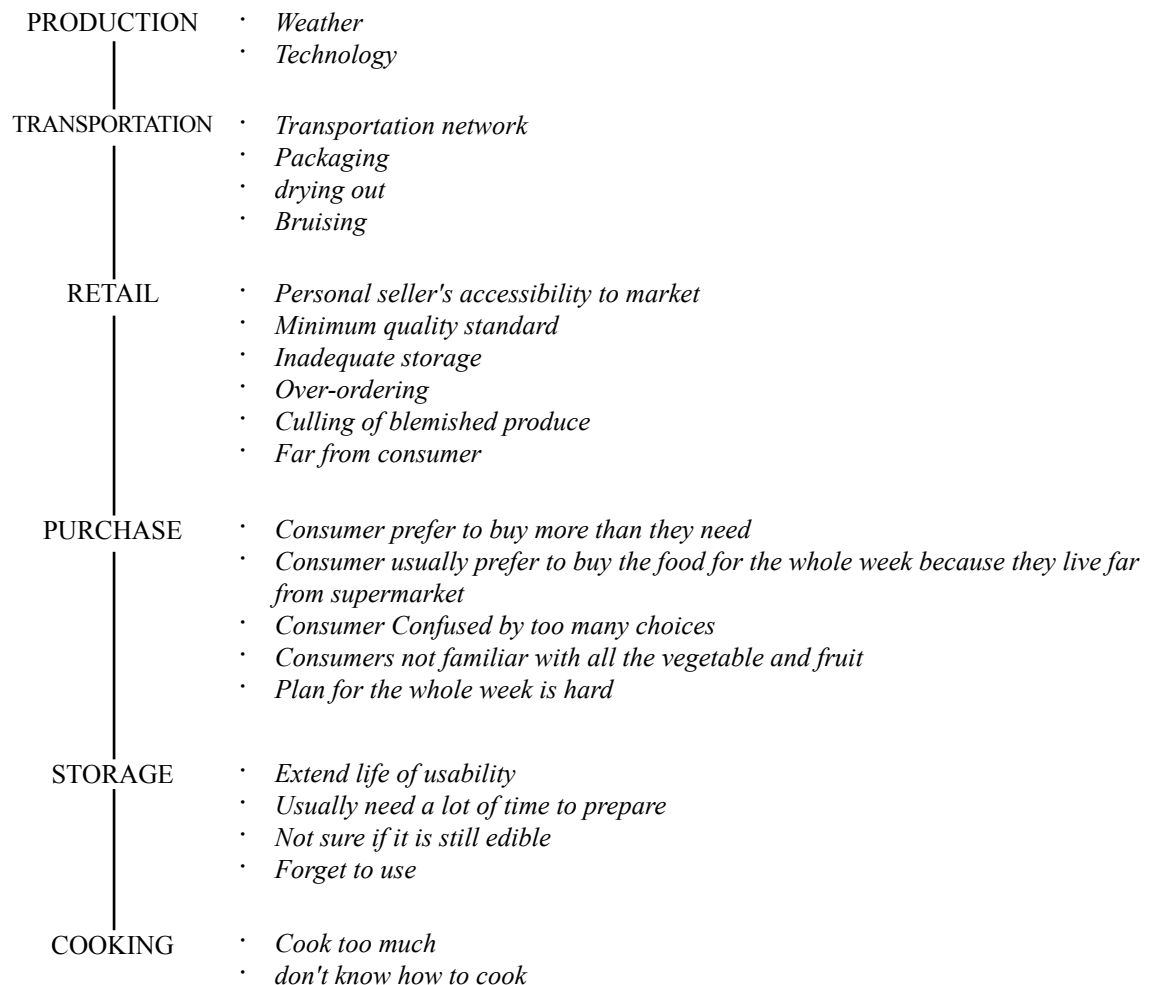
[1] Cawley J and Meyerhoefer C. The Medical Care Costs of Obesity: An Instrumental Variables Approach. *Journal of Health Economics*, 31(1): 219-230, 2012; And Finkelstein, Trogon, Cohen, et al. Annual Medical Spending Attributable to Obesity. *Health Affairs*, 2009.

Research

Life Cycle of Fresh Food

The cost of eating fresh food is rather high which make some people can not afford it.

The healthiest diets cost about \$1.50 more per day than the least healthy diets, according to new research from Harvard School of Public Health (HSPH). In order to figure out how to reduce the cost of eating fresh food, the life cycle of fresh food from how it is produced until people eat it need to be checked to find out which part can be improved.



Through out the research I found out that there are a lot of other reasons consumer not choose fresh food, and the biggest problem I find is waste during the retail, purchase,

storage and cooking process, if those waste can be saved it will actually help reduce the cost of eating fresh food.

Eating Habits of Americans

There are some numbers show Americans' eating habits: At least 1 in 4 people eat some type of fast food every day; Americans consume 31% more packaged food than fresh food; 20% of all American meals are eaten in the car.^[2] Americans has these eating habits mainly because of the urban structure, large amount of residents live in suburban area, who tend to use vehicles as transportation, they drive to work, and do grocery at large supermarket, which are all usually not close to where they live, research show that the national average, one-way daily commute is 25.9 minutes^[3] and The national average, one-way time cost to access to food market is 15minutes^[4].According to the Food Marketing Institute, shoppers hit the supermarket an average of 1.5 times per week, which means shoppers usually need to shop for the whole week, so they tend to buy more than they need which cause a lot of waste, research shows Americans are throwing out as much as 40% of their food, and fresh foods make up most of the discarded food, the average American wastes about 50% of the vegetables and 40% of the fruits inside and outside of the home,Up to \$2,275 is wasted each year by a typical family of four in this country, that is \$165 billion a year.^[5] Besides grocery store, the most common place people get food is fast food store, which is rather easy to access and save time.

[2] 11 Facts About American Eating Habits. <https://www.dosomething.org/us/facts/11-facts-about-american-eating-habits>

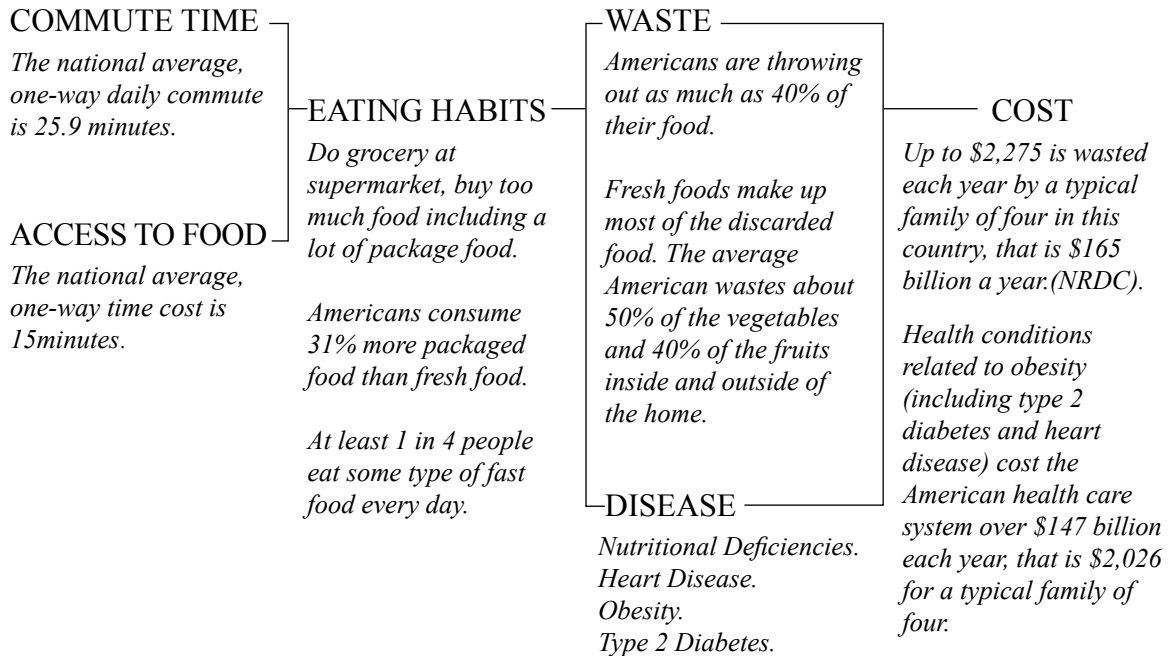
[3] According to U.S. Census Bureau

[4] Karen S. Hamrick and David Hopkins. The time cost of access to food – Distance to the grocery store as measured in minutes. 2012, Vol. 9, No. 1, 28-58

[5] Dana Gunders. Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill .August 2012 iP:12-06-B

Connection

After review all the research, I found out some connections between the key elements of my research.



Directions

According to the research, to help people eat more fresh food, there are two main direction I need to focus on:

1. Save time, which means how to bring fresh food closer to consumers.
2. Reduce cost, which means either reduce the price of fresh food by improve the supply chain or reduce the waste of fresh food.

Ideation

Concepts

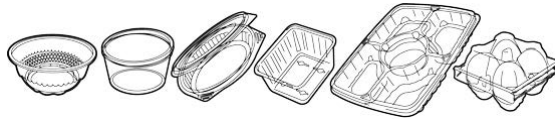


Figure 1 *Fresh food container*



Figure 2 *Timer sticker*



Figure 3 *Fresh food management APP*

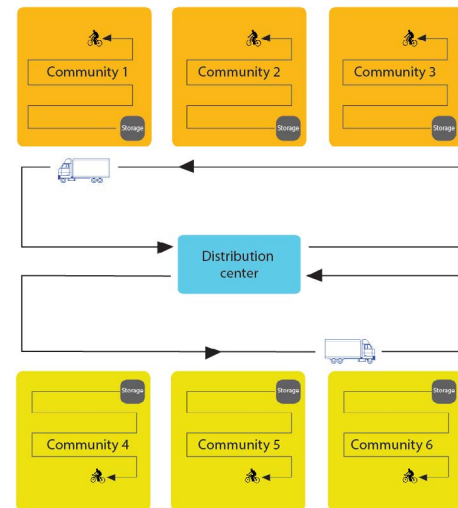


Figure 4 *Fresh food delivery system based on community*

According to the research, here are the 4 concepts that have potential to be moved forwards:

1. *Fresh food container*, it help extend the usage time of fresh food that help save waste (Figure 1).

2. *Timer sticker*, it reminds consumers to eat fresh food they bought before it goes bad, which helps save waste (Figure 2).
3. *Fresh food management APP*, it helps users manage their fresh food by reminding them to eat fresh food that is stay too long and creating recipes based on what users have. Which also help save waste (Figure 3).
4. *Fresh food delivery system based on suburban community*, suburban community is a common place where residents live in US cities, a fresh food delivery service adapting the features of this living pattern could be a great way for residents to access to fresh food, besides it could be a potential way to increase the social connections between neighborhoods which are declining compare to what it is like in the past (Figure 4).

Final Direction

Fresh food delivery system based on suburban community is chosen as the final direction based on the following reasons:

1. Save time by helping user order fresh food from home.
2. Save waste by providing service daily which makes it possible for consumers to buy what they need and enjoy the freshest fresh food every day.
3. Offer work opportunities for teenagers, especially high school students.
4. Create potential social connection between neighborhoods.

Compare to other concepts, Fresh food delivery system based on suburban community not only help user eat more fresh food by saving time and saving waste, but also has a some side benefits.

Further research

Target Market

Since the target market is residents living in suburban community, it is important to figure out how many people living in suburbs which determines if there is enough market to support this business, research shows, about 52% percent of Americans living in suburbs^[6], which is a huge market (Figure 5).

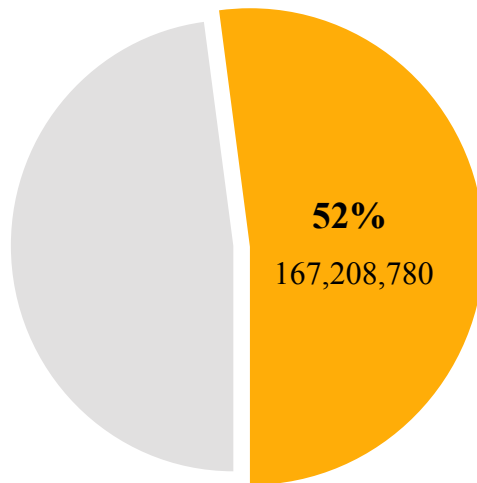


Figure 5 *Population live in suburbs*

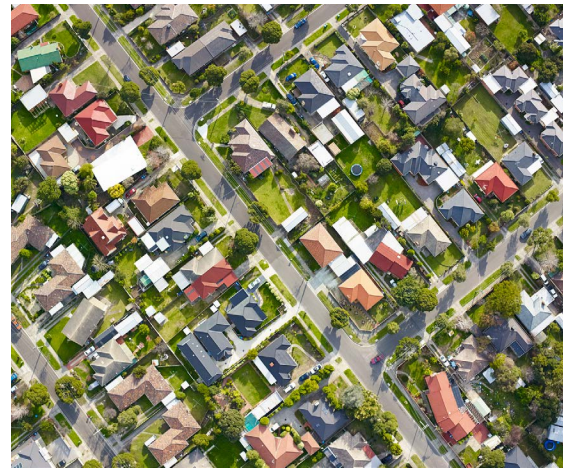


Figure 6 *Suburbs*

Since suburbs is so common in US, finding out it's features is important for further design process. There are some key characters about suburbs that are very helpful:

1. They have lower densities than central cities, dominated by single-family homes on small plots of land – anywhere from 0.1 acres^[7] and up – surrounded at close quarters by very similar dwellings (Figure 6).
2. Daily needs are not within walking distance of most homes.

These two features show that suburbs can be separated into small similar communities due to its similar dwellings, and residents' daily need of suburbs can be improved.

At last, residents' daily schedule are very important, they help determine when is the best

[6] POPULATION. <http://www.pbs.org/fmc/book/1population6.htm>.

[7] Jackson, Kenneth T. (1985), *Crabgrass Frontier: The Suburbanization of the United States*, New York: Oxford University Press, ISBN 0-19-504983-7

time for this delivery service to proceed. Time schedules of both main users which are employed adult and high school students some of whom will be hired to help deliver fresh food are listed to help further design (Figure 7) (Figure 8).

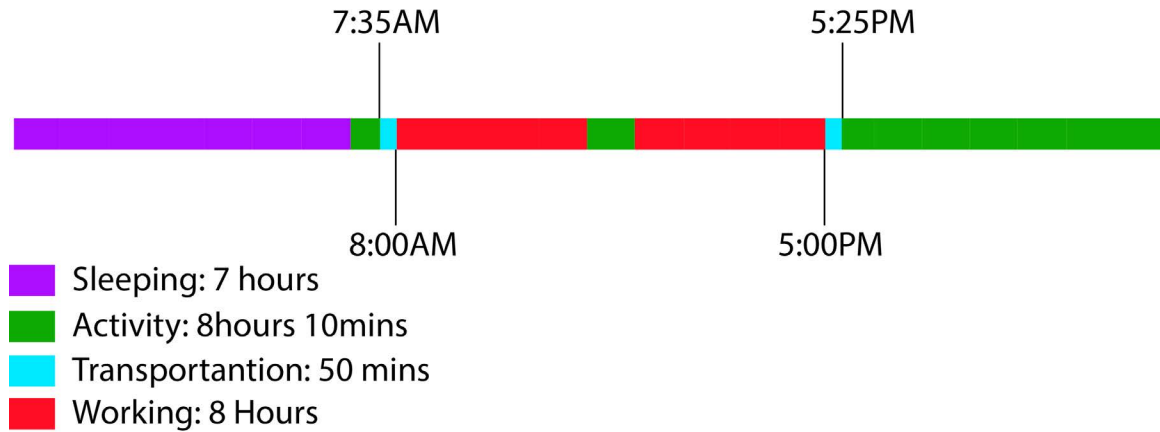


Figure 7 Time schedule of employed adults

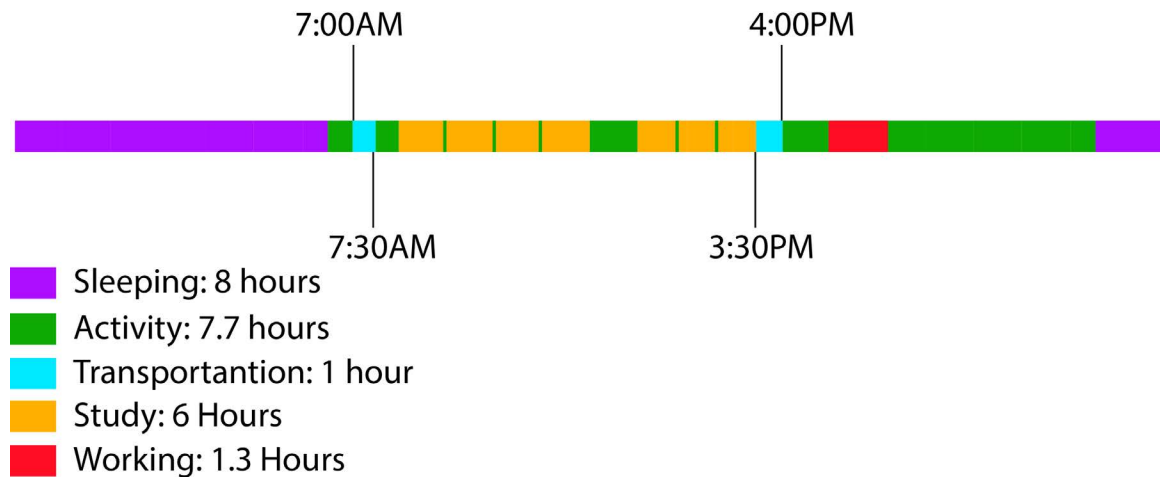


Figure 8 Time schedule of employed high school students

Benchmarking: Delivery Services

Since this is delivery service, learning from other successful business models of delivery companies is very necessary, I did research on Amazon (Figure 9) and UPS (Figure 10) to

find out how their business works

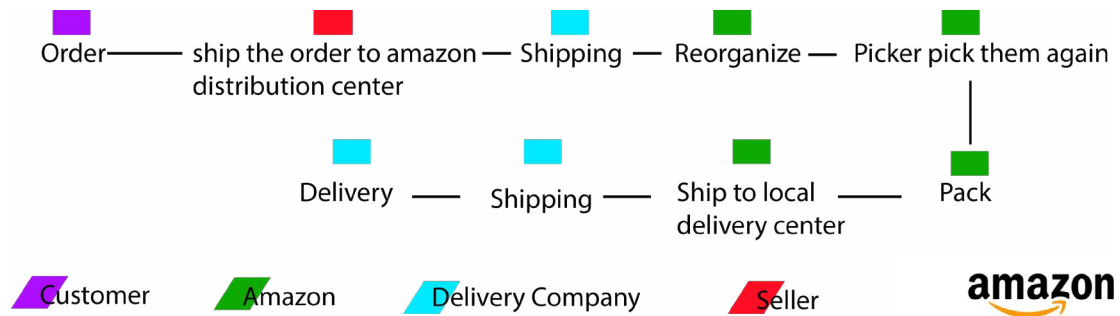


Figure 9 Amazon delivery service model

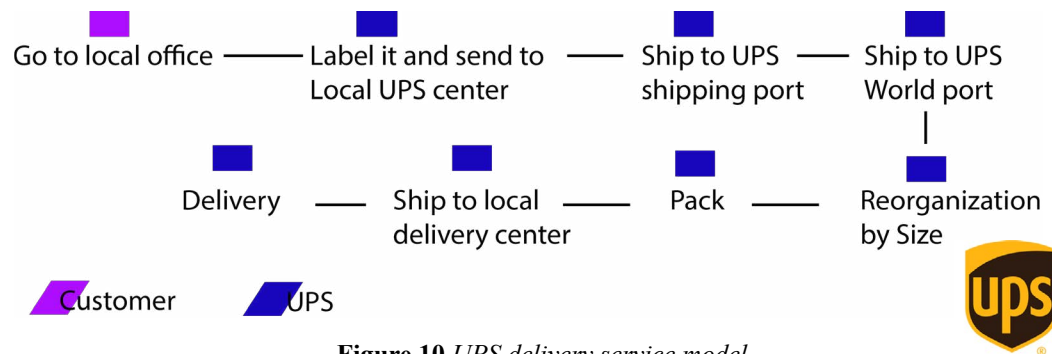


Figure 10 UPS delivery service model

Benchmarking: Fresh Food Delivery Services

There are already some fresh food delivery services exist in the market, after comparing 3 different fresh food delivery service including Amazon Fresh, Hello Fresh and Something GUD (Figure 11), I found out that the prices are rather high compare to other delivery service, and their services are usually only available in big city which has higher densities of population.



Service

Amazon Fresh offers FREE Attended or Unattended Delivery on orders of \$50.00 or more	3 Classic Meal Box for Two \$69.	\$5 for one time delivery
	3 Classic Meal Box for Four \$129.	Free for pick up
Or pay annual membership fee of \$299 get free same-day and early morning delivery on orders over \$35	3 Vegetarian Meal Box for Two \$59.	

Service

Order by 10 a.m. for delivery by 6 p.m., or order by 10 p.m. for delivery by 6 a.m.	<ol style="list-style-type: none"> 1. Hello Fresh create amazing recipes. 2. HelloFresh do the shopping for you. 3. Free Delivery. 4. Customer prepare delicious meals in your own home. 	Something GUD find the most responsibly-made local food, attempt to make it as convenient as possible to get that food from the producer to the consumer, and do so with the smallest environmental footprint we can.
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Area

Seattle, Los Angeles, San Francisco, San Diego, New York City, Philadelphia	Nationwide	I-95 belt around Boston
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Figure 11 Comparison of 3 different fresh food delivery service

Comparable model: Paperboy

This delivery service has a comparable model which is paperboy, it is also one of the inspiration I came up with this concept. Paperboy is a great model with a lot of similarity of my project. Learning how paperboy works is very helpful for me to understand how to manage the package transition between delivers and teenagers who are hired to help finish the final delivery process.

What also draw my attention is what paperboys will gain from their job, “Looking back I now realize that being a paperboy was great preparation for the life ahead. It taught me responsibility and punctuality. I learned to accomplish my tasks in spite of occasional boredom or other adverse conditions such as bad weather. I also learned how to deal with people on a professional basis through my weekly collections. I am willing to bet that most paperboys went on to become successful citizens.”^[8] This quote shows how much a job like paperboy will helps a teenager in his/her future, so I can image the jobs created by this project will bring a lot of opportunities for teenagers to learn and prepare for their future, which is a positive social influence from this project

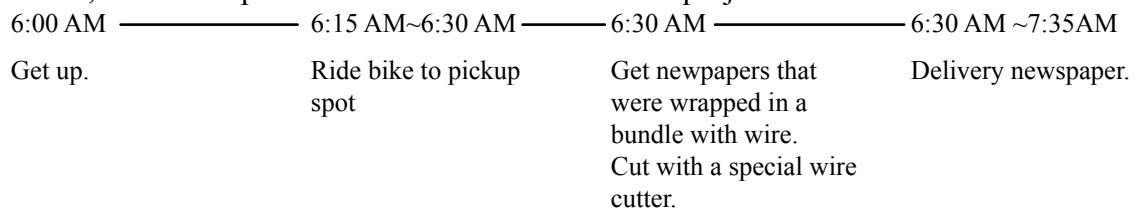


Figure 12 *A typical day of paperboy*

Design Process

Freshboy Delivery System.

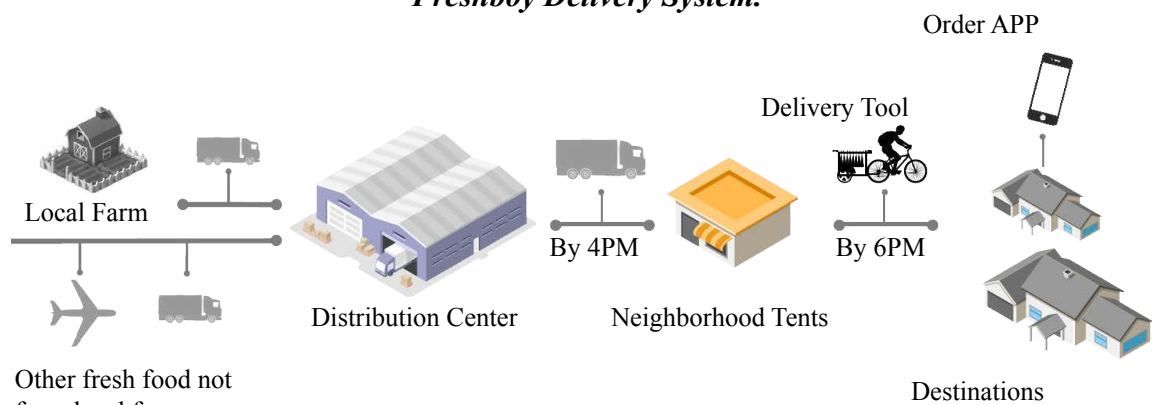


Figure 13 *System*

[8] David Uphoff. "Life as a paperboy". <http://www.minonktalk.com/paperboy.htm>

According to all the knowledge I have got, I came up with a complete system map(Figure 13). Here is how the delivery system works, a regional distribution center is in charge of gathering fresh food mainly from local trusted farm, but also from other sources if necessary, after receive customers' order, staff in this distribution center will sort their order into different packages, after that, packages will be delivered to certain neighborhood tents which could be a place offer by certain resident or in front of a local store. Then "freshboys" will go to their designated neighborhood tents to pick up packages and deliver them to final destinations.

In this system, there are two product need to be focused, one is the delivery tool and package, the other one is the order APP.

Delivery Tool and Package Design

Delivery tool concepts

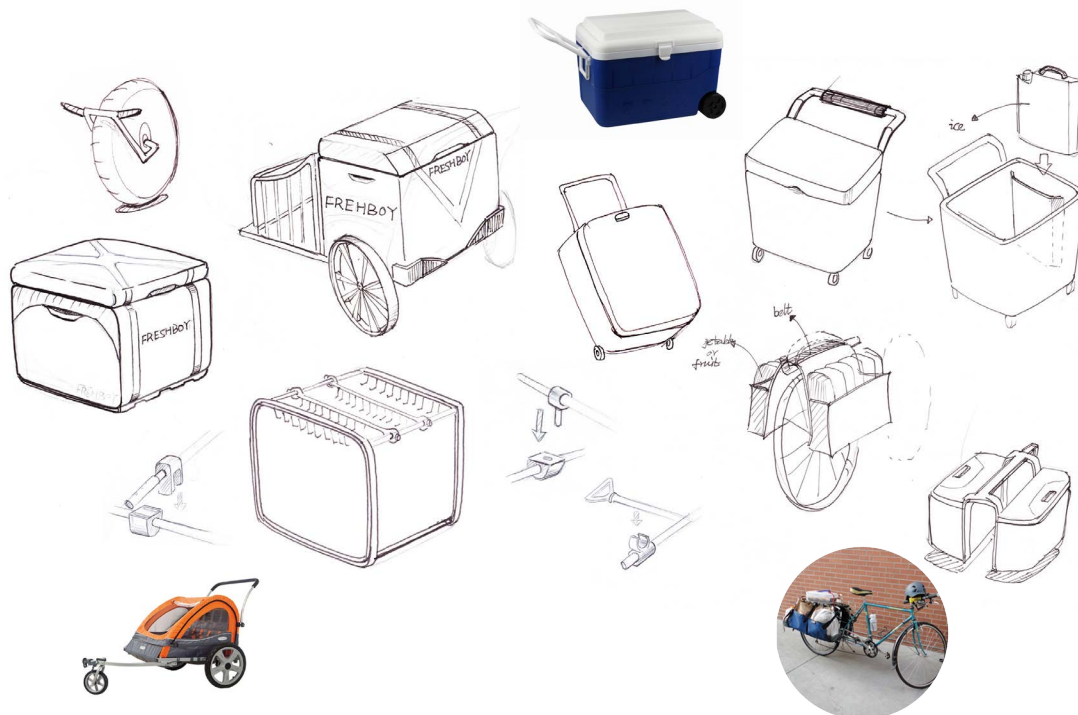


Figure 14 *Sketches and concepts of delivery tool*

After reviewing all the concepts, I choose the idea to design a cart with removable sticks, the stick has two handles at both end and has bunch of hooks, the deliverers can easily carry it and put it to the cart for freshboy to deliver, and it is totally reusable, it also make bags easy to organize and save the waste from making extra box to carry the bags. And the cart can be attached to a bike which helps freshboy to deliver.

Delivery tool prototype making process



Figure 15 *Delivery Tool prototype making*

Package concepts



Figure 16 *Sketches and concepts of package*

To fit the delivery tool, I chose the idea to design the package as a bag, the key elements about the bag are: it should be fully sealed and waterproof, besides to making the fresh food inside as fresh as possible, a bottle of ice water will be put inside in summer, and a bottle of regular bottle in winter.

Making Process of Delivery Bag

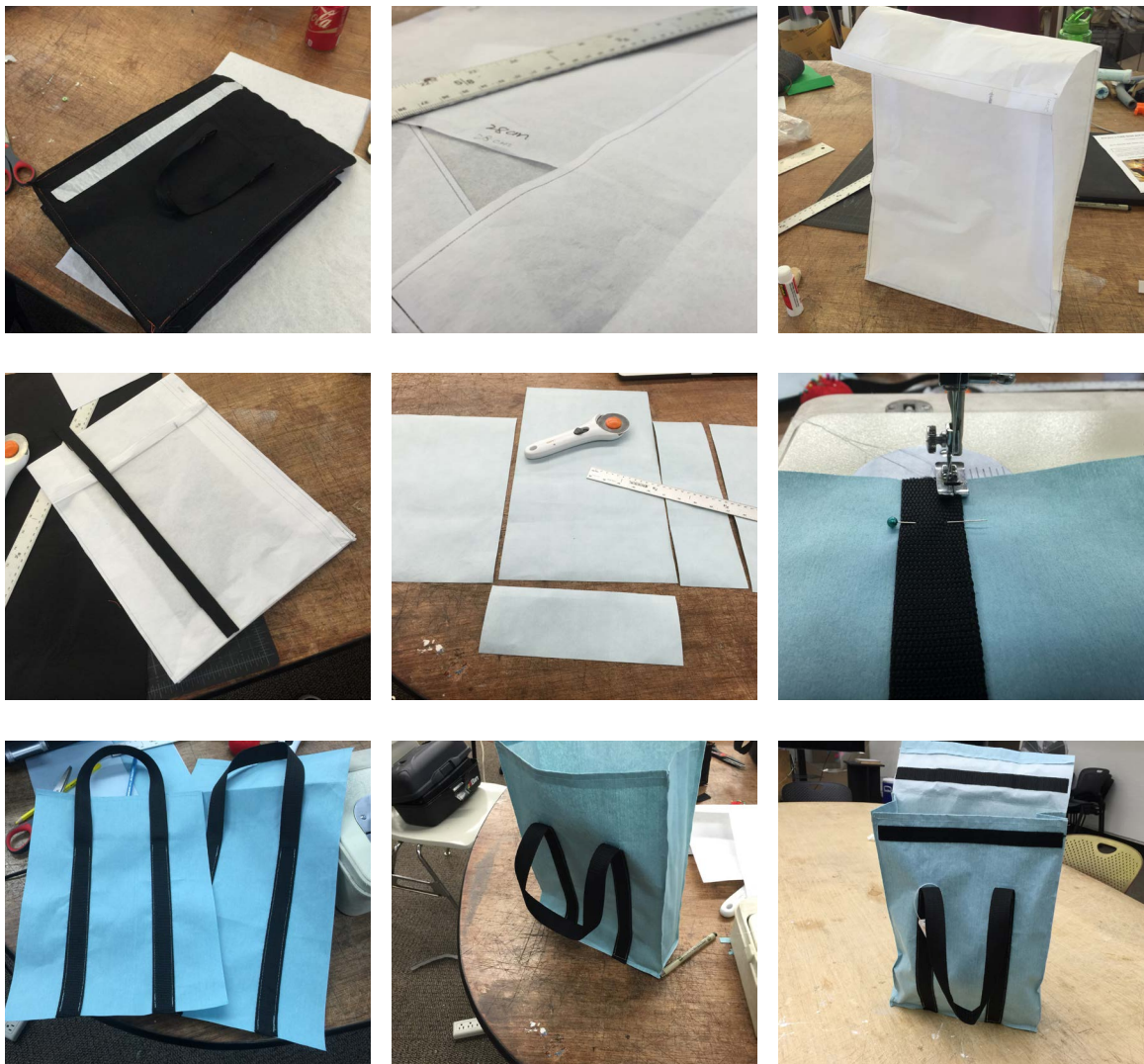


Figure 17 *Delivery bag prototype making*

Prototype showcase



Figure 18 *Delivery tool with a delivery bag hooked to the bar*



Figure 19 *Side view of delivery tool*



Figure 20 *Handle of the bar*



Figure 21 *Delivery bag*



Figure 22 *Two hands hold the bar to make the transition*

Prototype testing

After finish making the prototype, I took the prototype to do a road test to test it's performance in real life. The prototype was tested both with and without the cart attached to a bike (Figure 24) (Figure 25). The aim of this test including: test the user experience of using both mode, test if delivery bags drops during the testing process, test how it works in different work conditions (Figure 26).



Figure 23 *Attaching delivery tool to a bike*



Figure 24 *Testing with the delivery tool attached to a bike*



Figure 25 *Testing the delivery tool alone*



Figure 26 *Testing in different road conditions*

Delivery tool refinement

According to feedbacks and test result, a few adjustment need to be made, so I made a 3D model to show these adjustment and the final concept of the delivery tool.

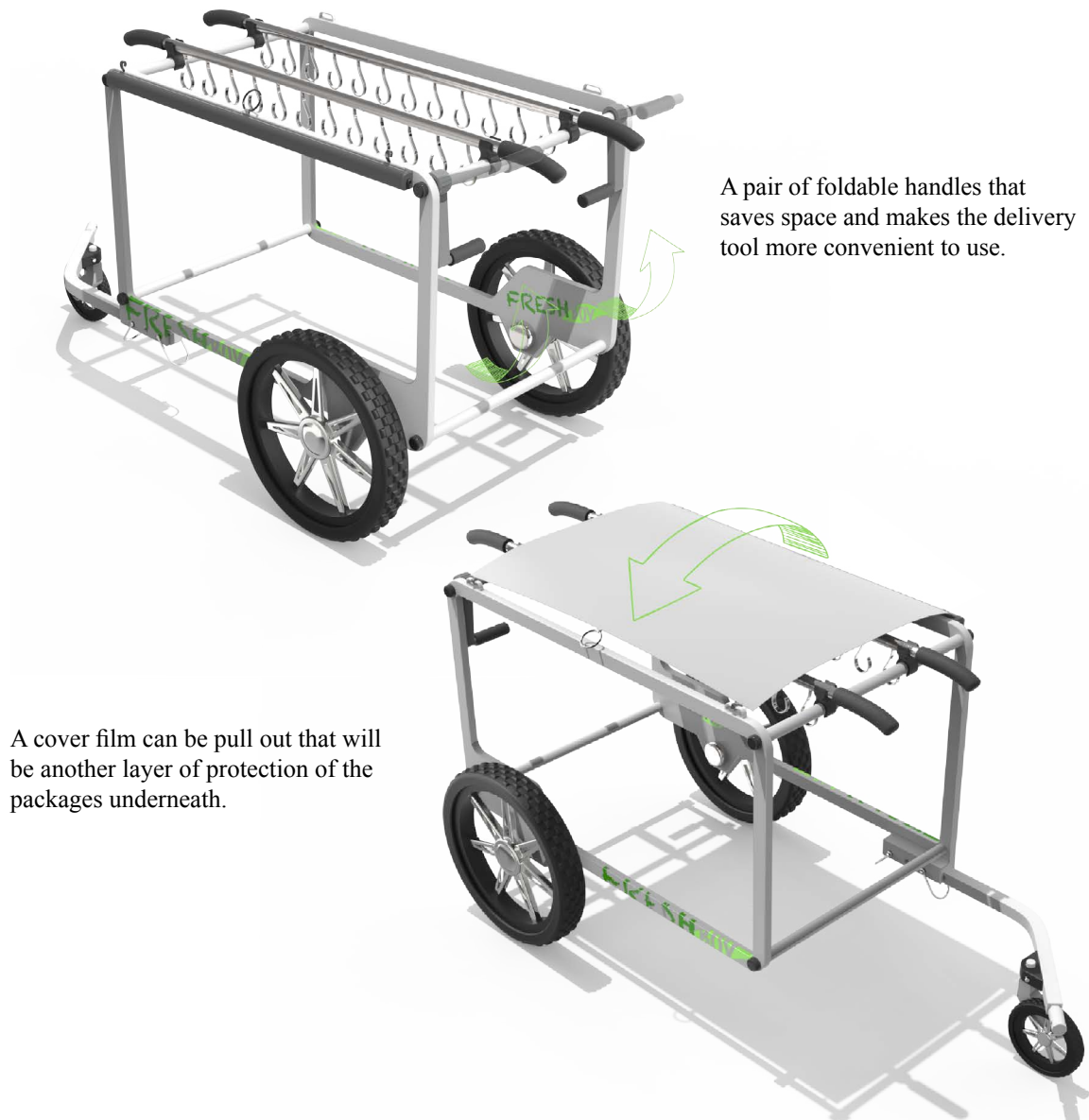
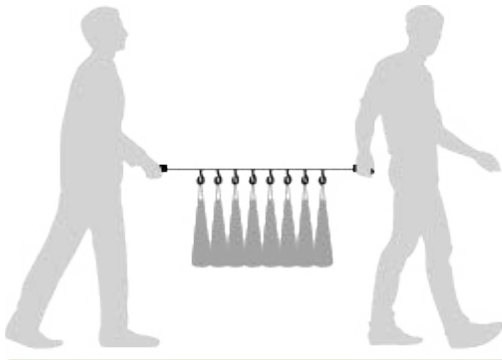
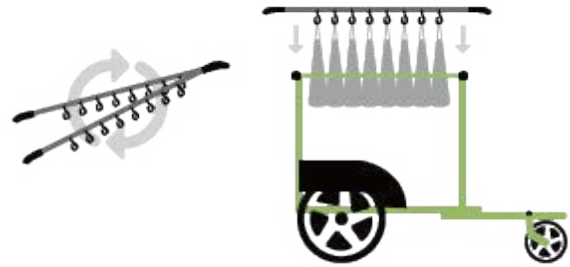


Figure 27 *Refined delivery tool 3D model*

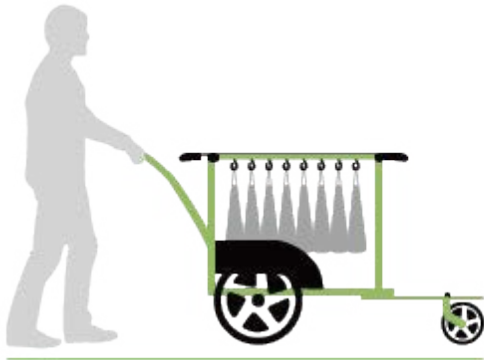
Features of delivery tool and delivery bag



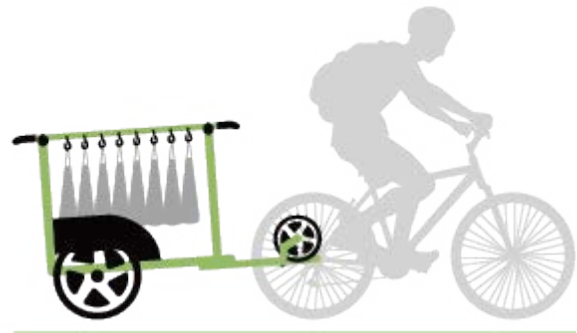
Packages hooked on a pole are carried by one or two people from the delivery truck to the neighborhood tents.



The new packages will be put into the delivery tool, and the old empty carry pole will be recycled.



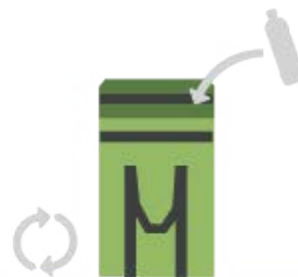
The delivery tool can be easily used, just like a cart.



The delivery tool can be attached to a bicycle if needed.



The package is waterproofed, also, inside of the bag, there is a overlay that can help insulated the fresh food inside. Besides, the handle that reaches the bottom of the bag makes the bag stronger.



The bag is reusable, can be retrieved by “freshboy” every day and recycled with the carry pole to reuse. A bottle of ice water or regular water will be put into the bag depending on the weather condition, which can help to keep the temperature inside stable.

Figure 28 *Design Features*

Order APP Design

This order APP is a daily used application, so it should be very straightforward and simple, and the main functions are making order, checking order and modifying order.

Concept development



Figure 29 *App concepts development*

For most users, they only make order one or two day ahead, so I came up the idea to create a bottom bar that has 3 boxes and each one represent a different day, in the box, there are small icons of the fresh food has been order for that day, which is very clear and straightforward for user to check. By clicking the box, users can view the order detail of that day and make changes. And by swiping the bottom bar, users can view different date. When making orders, it will be very easy for user to choose date, the center one is the chosen date, and the food icons will appear to show that their order has been successfully made.

Furthermore, the weekly plan option is to help users plan their weekly meals easier, for people do not know what to order (Figure 29).

Order APP flow

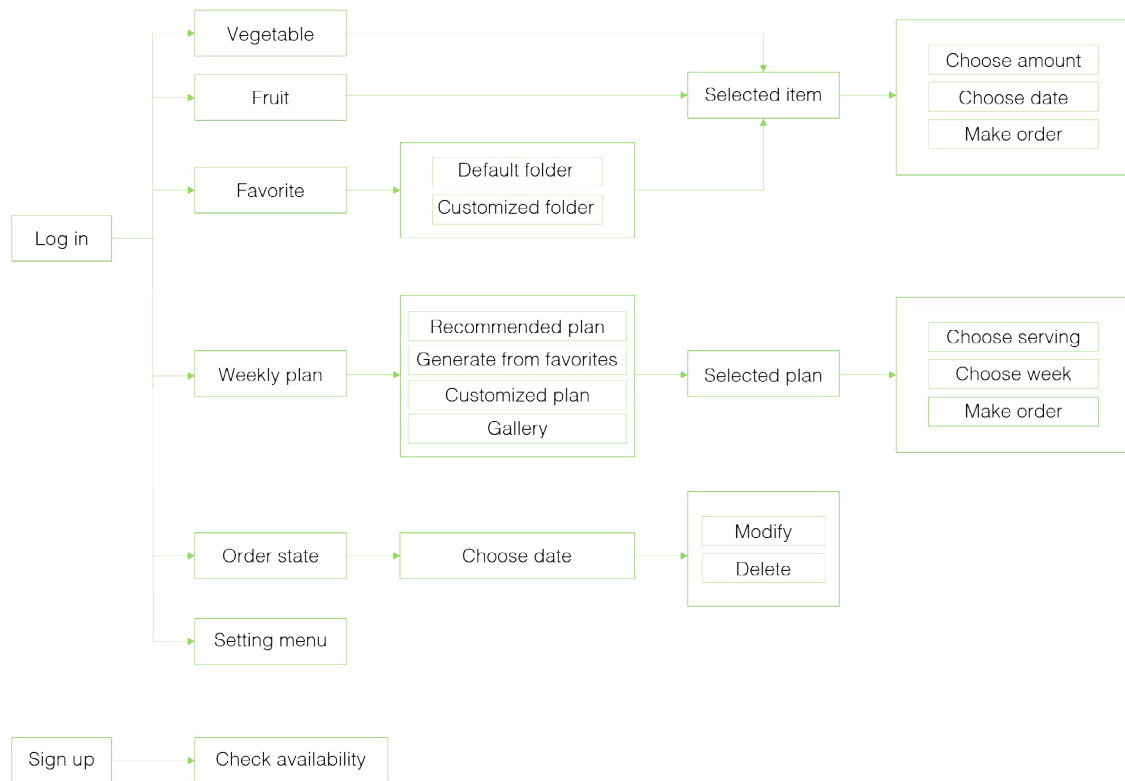


Figure 30 Order APP flow

Wireframes

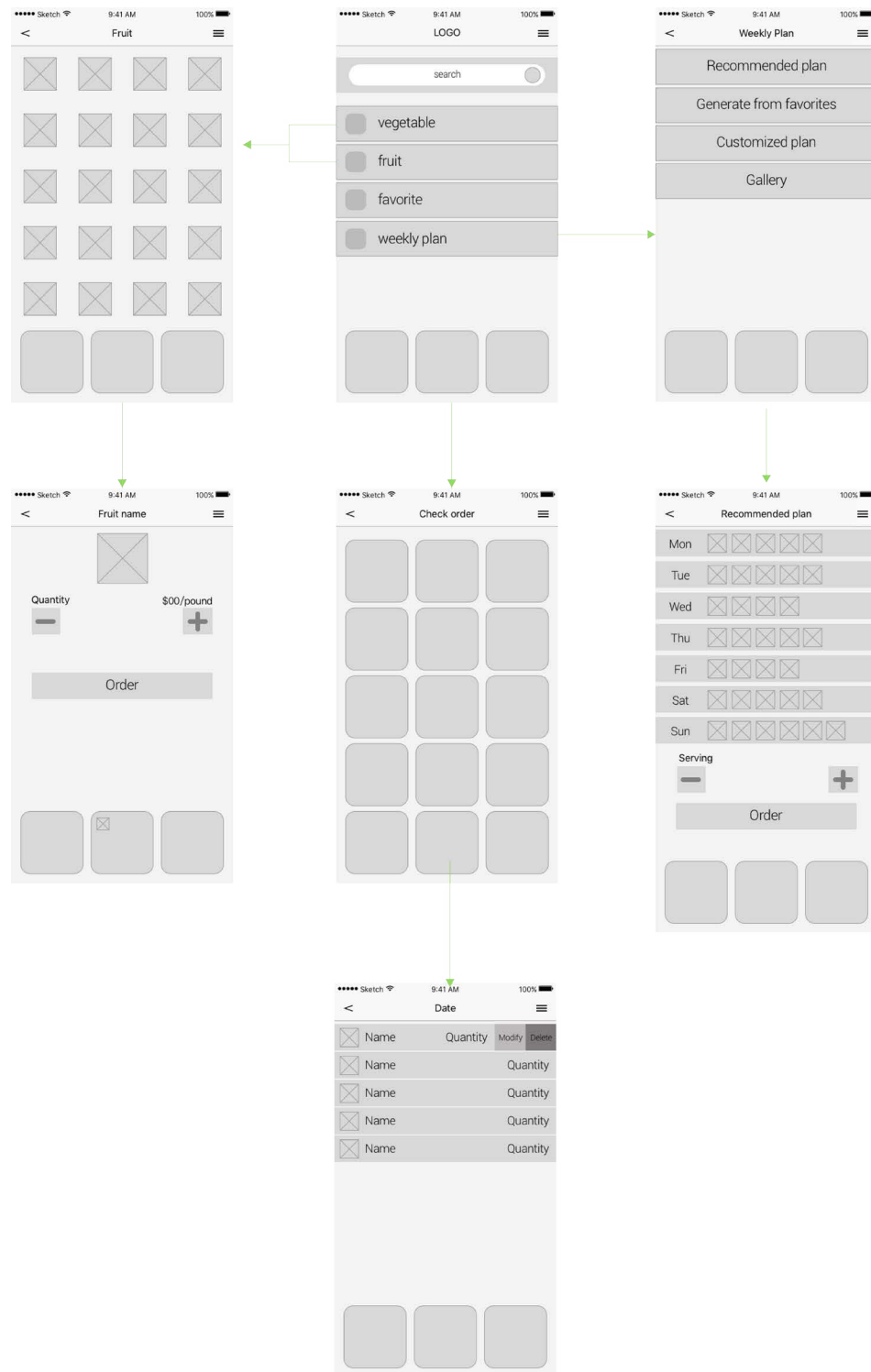


Figure 31 Order APP wireframes

User interface



Figure 32 *User interface design*

Conclusion

Unhealthy eating is a serious social problem in US, it causes a lot of diseases, and a lot money has been used to cure those disease related to unhealthy eating every year, since eating more fresh food is one of the simplest and efficient way to eat healthier, so helping people eat more fresh food will benefit the whole society. The reason why certain population do not eat enough fresh food is complicated and diverse, but according to my research, I found out that living in suburbs affect residents' eating habits which make it hard for them to eat enough fresh food, because grocery store usually far away from where they live and not in a walking distance, so they usually do grocery once a week, and distance between work and home is usually far, all these features force them to choose eating more unhealthy food like fast food and package food. Therefore, fresh food delivery system based on suburban community called FRESHBOY is designed to aim to change this situation, FRESHBOY offers fresh food delivery service by adopting features and advantages of suburban area, just like how paperboy used to deliver papers for their community. FRESHBOY help users to eat more fresh food by saving time for consumers, which could motivate them to buy more fresh food and saving the waste of fresh food for consumers, because consumers could buy fresh food day by day with small amount. Besides it offers working opportunities for teenagers, which can teach them responsibility and punctuality and potentially creates social connection between neighbourhoods, like the potential conversation between the consumers and “freshboys”.

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